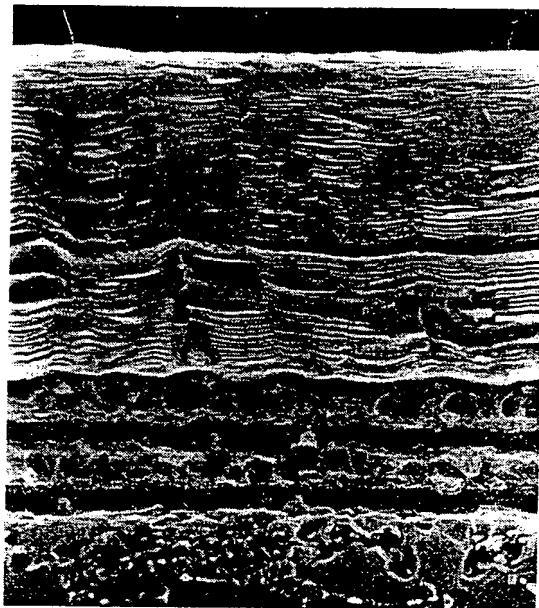


09/700473

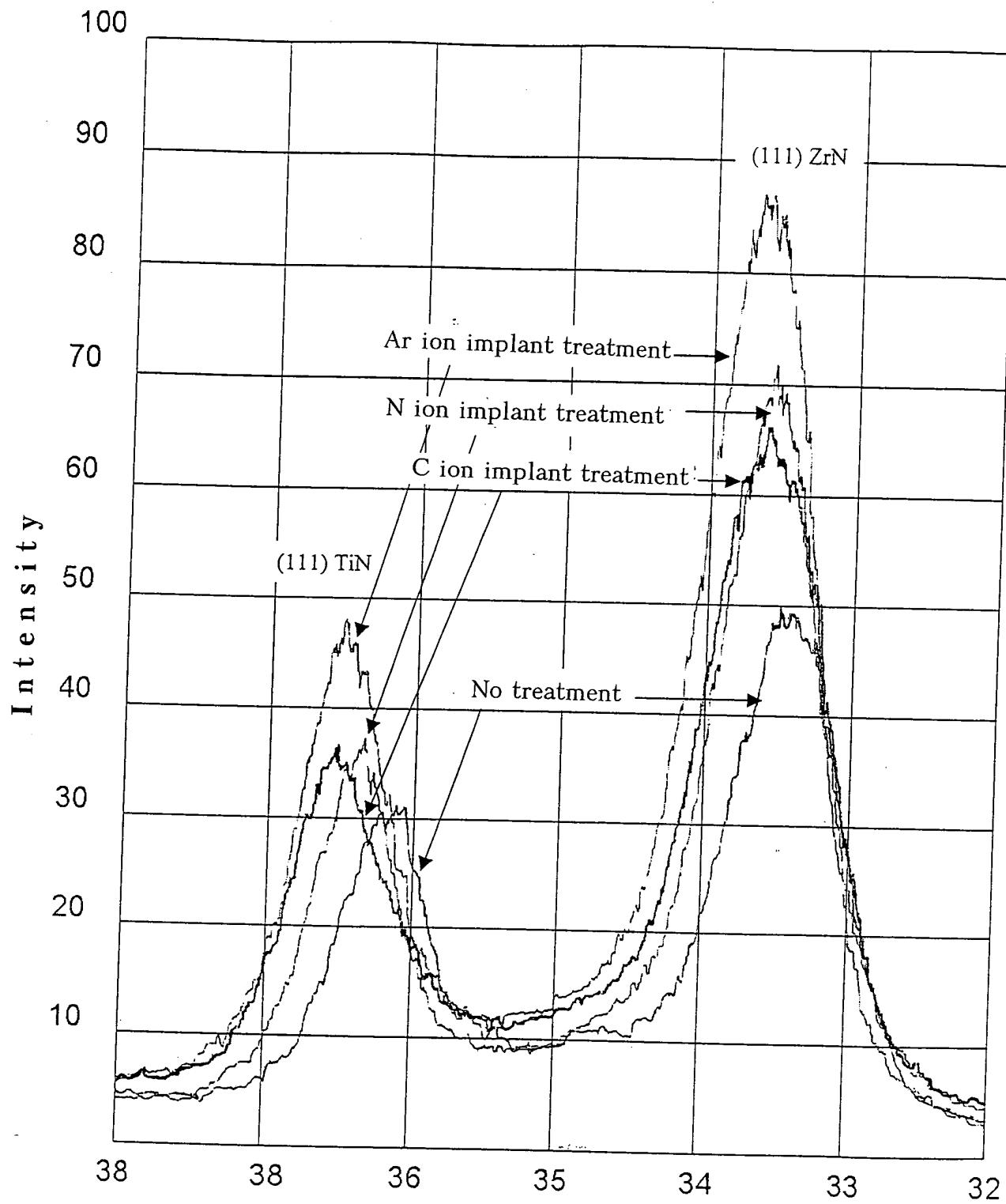
1/6



**Fig. I Microstructure of the wear-resistant coating on an aircraft engine  
blade of titanium-based alloy, x500x2.**

09/700473

2/6

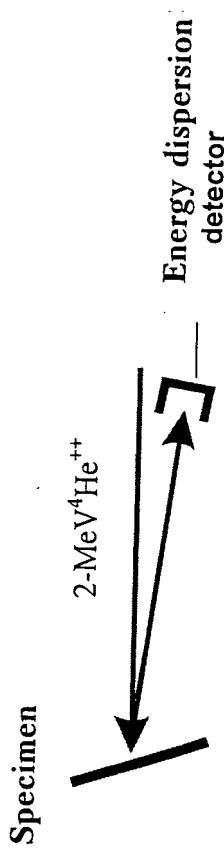


$2\Theta$ , grade

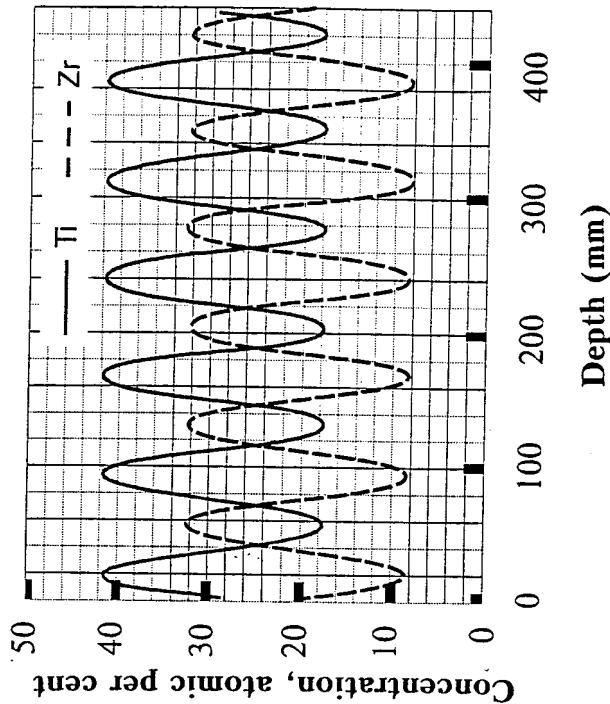
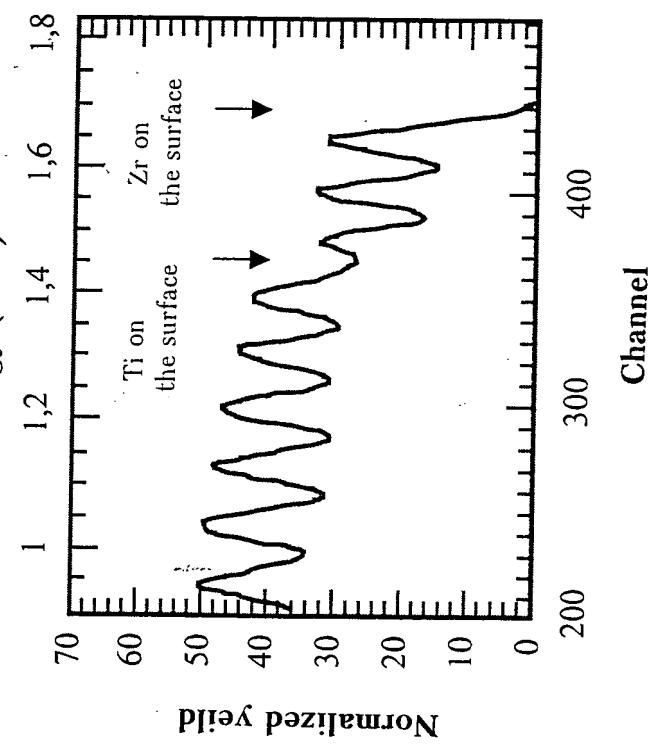
Fig. 2

## Multilayer structure of coating

- Dark scattering of ions as a function of atomic mass, scattering angle and depth under the surface (through the energy losses)
- Back scattering spectrum scanning shows the composition distribution through depth



**Composition profile of the coating outer layer**



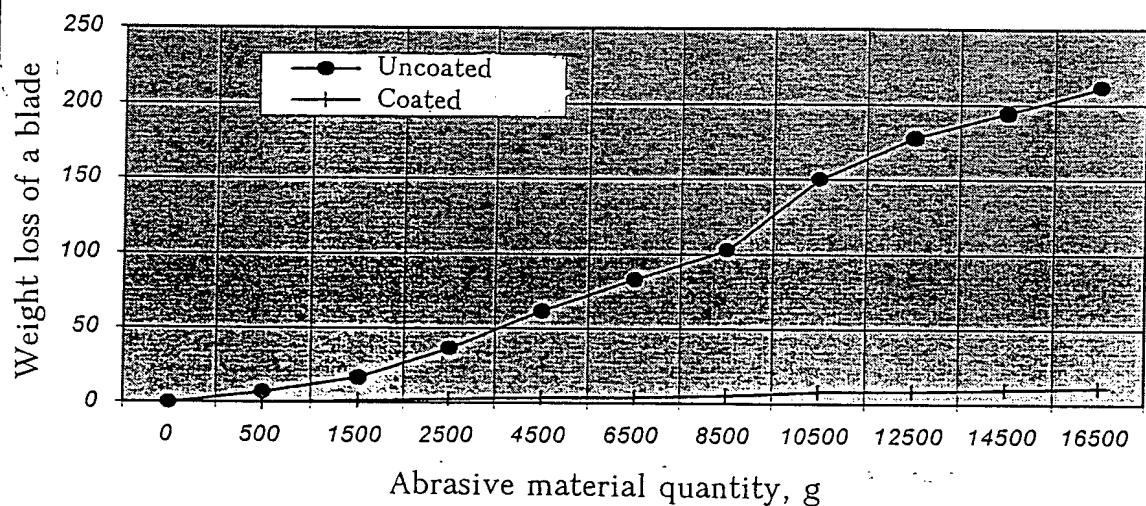
**Fig. 3**

09/700473

4/6

Number of test	Abrasive material weight, g	Weight of blade, g		Weight loss, mg		Total weight loss, mg	
		Uncoated	Coated	Uncoated	Coated	Uncoated	Coated
0	0	25,93467	26,68606	0	0	0	0
1	500	25,92766	26,68604	7,01	0,02	7,01	0,02
2	1500	25,9176	26,68412	10,06	1,92	17,07	1,94
3	2500	25,89843	26,68318	19,17	0,94	36,24	2,88
4	4500	25,87291	26,68266	25,52	0,52	61,76	3,4
5	6500	25,85201	26,68203	20,9	0,63	82,66	4,03
6	8500	25,83202	26,68087	19,99	1,16	102,65	5,19
7	10500	25,78469	26,67814	47,33	2,73	149,98	7,92
8	12500	25,75645	26,67761	28,24	0,53	178,22	8,45
9	14500	25,74019	26,6761	16,26	1,51	194,48	9,96
10	16500	25,72354	26,67494	16,65	1,16	211,13	11,12

Erosion values represented by weight loss in testing conducted on gas-turbine engine compressor blades



#### Testing conditions:

Flow rate	212 m/s
Temperature of air	20 °C
Abrasive material	quartz sand, of 10 microns granularity
Attack angle	20°

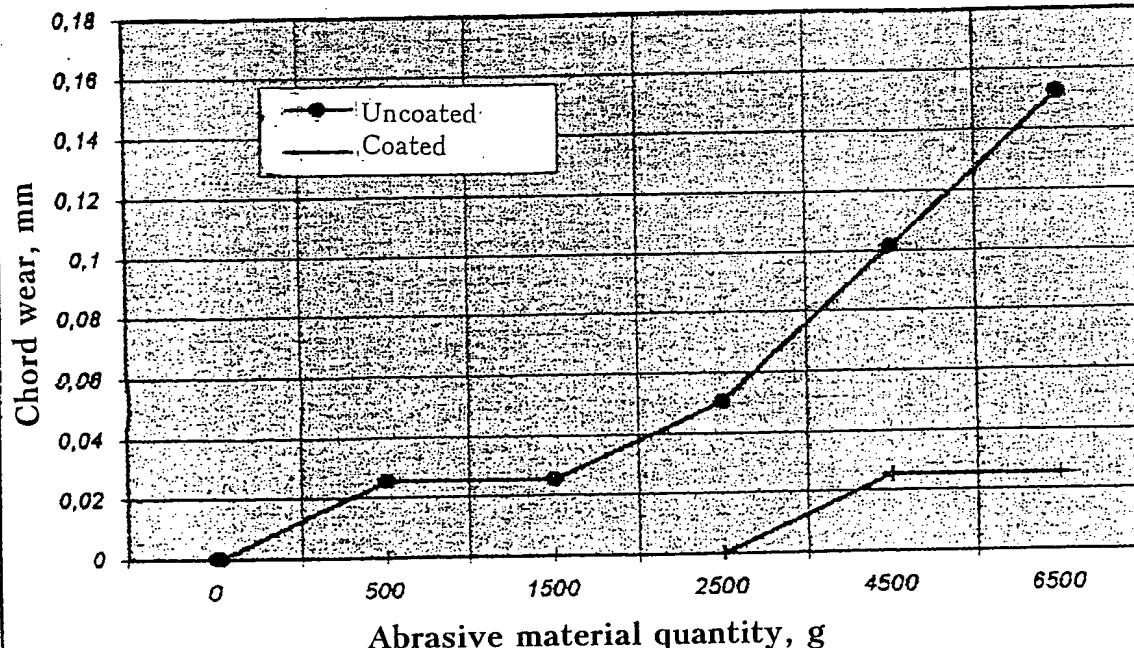
Fig. 4

09/700473

5/6

Number of test	Abrasive material weight, g	Chord		Chord wear, mm		Total chord wear, mm	
		Uncoated	Coated	Uncoated	Coated	Uncoated	Coated
0	0	34,798	35,0012	0	0	0	0
1	500	34,7726	35,0012	0,0254	0	0,0254	0
2	1500	34,7726	35,0012	0	0	0,0254	0
3	2500	34,7472	35,0012	0,0254	0	0,0508	0
4	4500	34,8964	34,9758	0,0508	0,0254	0,1016	0,0254
5	6500	34,6456	34,9758	0,0508	0	0,1524	0,0254

Erosion values represented by chord wear in testing conducted on gas-turbine engine compressor blades



#### Testing conditions:

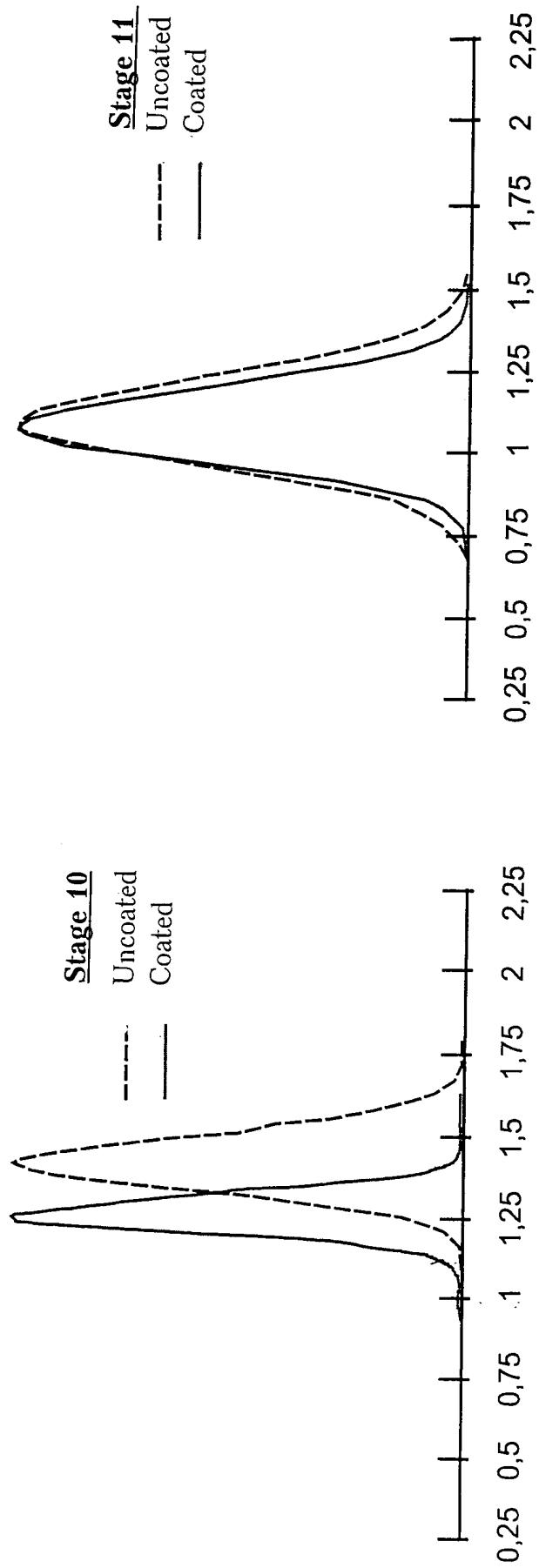
Flow rate	212 m/s
Temperature of air	20 °C
Abrasive material	quartz sand, of 10 microns granularity
Attack angle	20°

Fig. 5

09/700473

6/6

Fatigue test results obtained  
on compressor blades with and without coating



Normalized fatigue strength  
Normalized stress ratio

Fig. 6